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ABSTRACT

Working education in the USSR prepares students for socially useful and productive work by equipping them with the knowledge, abilities, skills and attitudes necessary for collective activities. Working education does not give students a profession but rather prepares them to master one by including in its curriculum professional knowledge and skills, physical exercise, technical problems, practical training, and lab work, all in a productive setting which uses the students' knowledge and stimulates further learning. The program continues through all ten grades in three increasingly complicated stages: grades 1-3, introduction to productive work: grades 4-8, initial knowledge of various technical, service, and agricultural activities, and contemporary applications of science in industry and agriculture: grades 9-10, training towards a trade specialty and transition to professional work. Many academic subjects are closely related to the productive activities of working education. In one work-study program being tested, rural students' studies and jobs are sex-determinant. Work, further determined by curriculum, focuses on selecting work objectives which have social significance, are age-appropriate, foster a love of work, and closely approximate real working conditions. Students participate in the complete spectrum of rural agricultural activities, guided in part by experienced local workers. (SB)

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COMBINING EDUCATION AND WORK

Experiences in Asia and Oceania

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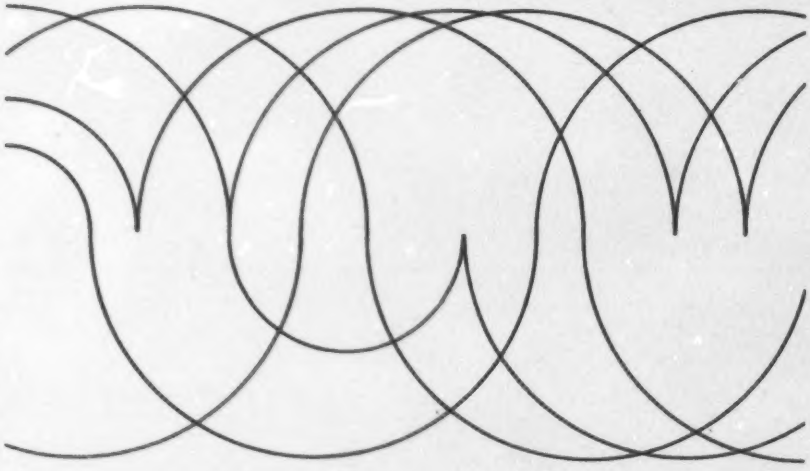

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COMBINING EDUCATION AND WORK

Experiences in Asia and Oceania

Union of Soviet Socialist Republics

Prepared by N.P. Semykin
Director
Institute for Research on Education for Productive Work and Polytechnical Education
Academy of Sciences of the USSR

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PREFACE

Many countries in Asia and Oceania, as in other regions of the world, are engaged in reorienting their education systems. A basic concern underlying these efforts is to make education functional and relevant to the needs of the individual and of the society. It is increasingly felt that the education systems tend to get isolated from the larger social, cultural and development goals of the society. This isolation is engendered when the process of learning is separated from the context of action and work, and is nowhere as marked as in the failure of education to provide children and youth with an active comprehension of the world of work.

The response to the problem is reflected in a variety of programmes underway in several countries of Asia and Oceania. Considering the importance of the issue, the Fourth Regional Conference of Ministers of Education and Those Responsible for Economic Planning in Asia and Oceania (24 July - 1 August 1978, Colombo) has "Interlinking of Education and Productive Work" as one of the major themes of the Conference.

The country studies presented in the present series were received in response to Unesco's request to the Member States. The initial issue covered studies received from twelve countries. Since then the present study on the experiences in U.S.S.R. has been received and added to the initial series in an English translation of the original text in Russian. The assistance of Unesco National Commissions in these countries in having the studies prepared and of the organizations and scholars who have been responsible for them is gratefully acknowledged. These studies cover a wide spectrum of experiences, ranging from experimental projects to comprehensive, system-wide programmes, and detailed descriptions are offered of one or more projects in actual operation. It is hoped to add to the series as more country studies become available.

Opinions expressed in this publication are those of the author and do not necessarily represent the view of Unesco.

I. GENERAL DESCRIPTION AND POLICY TRENDS

Formation of the right attitude to work for the younger generation entails equipping them with the knowledge, ability and skills necessary for work activities. Preparation regarding the right choice of profession is an important task of schools today.

Having laid down the fundamental basis for the Soviet School, V.I. Lenin stressed "... it is impossible to imagine the ideal future society without the link between education and productive work" (Vol. 2, p. 85 Russian text). The ideas of V.I. Lenin found their reflection in the decisions of the Communist Party, implemented by the Soviet People.

In the decree adopted by the CC of the CPSU and by the Council of Ministers of the USSR "On the Further Improvement of Education, the Upbringing of pupils from General Secondary Schools and their Preparation for Work" (December 1977), it is stated that Secondary School graduates should have sound knowledge of the basics of sciences and work skills.

In the USSR, children are completely free from participation in the productive process as a labour force; child labour, if it is not connected with education and work education, is forbidden by law.

The most important criteria of youth's preparation for productive work is their development of mental abilities and physical fitness. Consequently initiation of school pupils to physical labour is a means of all-round development of the personality.

A considerable contribution towards the development of the Youth Education Theory was made by A.S. Makarenko He believed that the results of children's work activities would be considerably higher if the work was organized as productive, for education then attains its higher form, i.e. productive education.

The practice of A.S. Makarenko has confirmed the effectiveness of conformity with the law and the necessity of transformation of labour education at its higher level.

Combining education and work

In the USSR, subsidiary out of school establishments that deal with work and techniques, children's technical stations and 'Young technicians' clubs have proved to be very popular.

School children's productive brigades, camps for recreation and work, school forestry, children's railways, school factories, inter-school educational-productive group enterprises, school shops, etc., have been created and developed for school children.

Tremendous expenditure is involved in the creation of all these means of giving the new generation access to labour and, by the time school graduates enter the world of work in factories, plants, construction sites, collective farms or *sovkhoz*, they will have been through certain stages of labour education at school.

The aims and contents of labour upbringing and education of students from general secondary schools and their participation in productive work are determined by a comprehensive socio-economical programme on the development of society and arise from the demands which are presented by the characteristic, modern industrial process and scientific-technical progress. Carrying out labour upbringing and education, introducing productive work for the growing generation, the labour components and pedagogic requirements, which are laid down by the character and contents of the work, are taken into account, so that as a result of these activities, school students will have attained knowledge, abilities and skills necessary to participate in collective work.

The raising of the requirements of the work involves high-level professional education, broad general and specialized knowledge and the general culture of workers in all spheres of the national economy.

However, research has shown that not every job requires a creative approach and only creativeness. Even in the era of scientific and technical revolutions, in the age of machines, we cannot consider manual work as an anachronism. Manual work was and still is one of the powerful channels of the sensual connection of the human brain with the world; it still serves as a means for human beings to learn about the world and themselves and is an effective way of learning and mastering the tools, materials and productive processes.

It satisfies the child's need to perform purposeful productive activities, develops active observance in him, precision in working operations, mental skills and basic abilities to materialise his ideas, develops willpower, purposefulness and a number of other important character traits.

It is presumed that man himself does every job joyfully and creatively. There is no uninteresting work, there are only disinterested people.

So in work today two tendencies are observed: on the one hand the broad use of modern technology and automation and development of creative work and on the other hand the existence of manual work, work which does not require much creativity.

In connection with these tendencies, the contents of the work vary. For which of these two tendencies should youth be prepared?

It does not seem possible to reply to this in one word. We presume that, first of all, children should be educated in order to use modern and future techniques and machines that include a creative basis.

Such a view, and also the rapid development of science and technology, followed by the rise in prestige of 'white collar' professions, gave birth, among parents and pedagogists, to ideas of which the intellectual basis is of paramount importance in the formation of the child's personality, disregarding, more often than not, their manual creative activities.

The negative consequences of such an attitude could be traced to the fate of many a young man, as well as to some negative developments in the lives of some young people.

The fact is that when children are involved only in the process of learning, their output falls drastically. Observations reveal that in the first grade children are at their most industrious, then this activity decreases very quickly. The formation of work skills is easy at an adolescent age but, as a man grows older, it is a more difficult process which requires more time and expense. For example, the skills necessary to drive a car at the age of 10-11 require only 3-4 hours of driving practice, whereas an adult needs 50-60 hours. Consequently, the second direction of

school activity is the broad involvement of school pupils in different work, manual work included, bearing in mind that even in our era of development of mechanization and automatization, conditions are dictated not only by the most sophisticated highly productive machines, or by highly productive labour, but also by less perfect technologies and by manual work in certain operations.

Inclusion of the elements of productive work in school practice is important from all points of view. It also helps to attain certain skills and abilities, which are useful in future in speeding up the acquisition of a profession, creates material values, fosters willpower, character, responsibility, collectivism, and along with polytechnical education orients students in the main branches of the modern economy, making the basis of their professional choice broader and more comprehensive.

Such an attitude is directly opposed to those career advisers who call upon youth to look for a very restricted profession, which responds only to narrow interests, abilities and aptitudes. Thus their affirmation is consonant to that of a Spanish philosopher, Juan Uarite, who wrote four hundred years ago: "Nature .... can give every man but one gift .... Capabilities of man so limited that he can master no more than one profession". The foregoing entirely excludes the development of the creative potential of the personality. Consequently, one cannot agree with this affirmation.

School, which orients children towards brainwork, revealing a limited, narrow interest, tends to lead them towards a single walk of life. It is known that abilities and aptitudes of man are dynamic, they should be comprehensively developed through getting into the habit of doing varied work, implanting skills which will be useful for a man of any profession, no matter whether he be a musician, tractor-driver, sculptor or fitter, pilot or salesman.

The system of working education in schools of general education based on drawing pupils into productive work, doing some sort of manual work, should take into account the objective requirements of industry.

What is the matter of principle, it is not said of any single type of work or activity. The variety of activities and the totality of different types of work should by

all means be introduced. All of them are required in the educational work of schools, although not to the same extent and dependant on different ages and specific tasks of a school. No one type of work should be avoided. The comprehensive development of the personality can only be resulted from the comprehensive activity. A well-conceived system of instruction in how to do the productive work, ensuring the interrelation of general subjects, is one of the conditions of drawing pupils into this work.

Taking into account a concrete form of productive activities, the working education of pupils should be a constituent part of the general polytechnic education creating conditions for the comprehensive development of the personality as well as for the initial preparation for work in industry and subsequently for improving the professional qualification of the future worker.

Working education at secondary school is, first and foremost, a realization in the process of working activities of an integrated system of factors which should lead to inculcating into pupils those characteristics necessary for life. Thus, the education based on work in the process of learning (as well as the orientation to a profession) should be goal-oriented and based on the pupils' participation in a concrete work, when they can apply the knowledge acquired in lessons (or acquire new knowledge) to a concrete profession, acquire or improve certain skills, plan their work, control the process and the results of their work, creatively solve the problems.

The introduction of elements of the productive work into the system of the work education is a kind of connecting link between theory and practice.

Using the functional laws concerning reflection by the brain of the objective reality established by psychology, the teacher takes precisely the practice as the major characteristic which defines pedagogical notions like 'knowledge', 'abilities', 'skills'. To prepare a pupil for an occupational activity means first of all to equip him with labour abilities and skills, (which could be intelligently and automatically applied by him). General working abilities and skills include those necessary for the planning, organization and control of the process and the results of work, abilities and skills to work creatively and to work collectively. The totality of these abilities and skills

characterizes the general culture of the worker of the socialist production.

The list of general technical abilities and skills is considerably larger than that of general working ones. The latter include the graphic abilities and skills, the totality of which is characterized by the notion of 'graphic skilfulness'. To this category belong also the abilities and skills to operate the apparatus and instruments for testing and measuring. The general technical by nature are also the abilities and skills to assemble and disassemble, those of utilizing various devices and tools, operating standard machines, apparatus and mechanisms, ability and skills to regulate and repair them, etc.

The pupils' participation in practical work necessitates, beyond general working and general technical training, some specialized training predetermined by the specific character of the concrete work.

The pupils should acquire some professional knowledge and skills in order to be able to do the work correctly and of high quality. This includes the ability to operate equipment, to carry out technological operations, relating to the fabrication of products and to their delivery to customers; for example, the ability to operate a bench when working in a workshop or ability to assemble various electrical systems when being involved in the productive work of electrotechnical profiles.

The original practical activity of pupils promoting the training of general working, general technical and special abilities and skills is carried out in the process of exercising, solving technical problems, practical training, practically oriented laboratory work and socially useful and productive work.

School does not pursue the task of giving a profession to every leaver. It only prepares the pupil to master a profession. The realization of this approach to the problem is more complicated than merely to give a profession. The conceptual outlook on the working education of pupils includes in a broad sense the ability to do manual work, brainwork and creative work, experimentation of various kinds, acquisition of professional skills, participation in the productive work. It includes also the inter-relationship between adolescents, the attitude of adults towards

youth, increasing the qualities of collectivist, high-mindedness, aspirations for introducing change, moral and aesthetic aspects. Working training and participation in socially useful productive work are considered as means for work and moral education, as a combination of manual activity and formal learning at all levels of education.

The main task of working education for youth is the formation of the readiness to work which includes two components: moral and psychological and practical preparedness.

The first of the above-mentioned components is characterized by the attitude of pupils towards people, work and means of work, by their sense of duty with regard to their class, school and society on the whole, by the desire to reach goals through the full mobilization of personnel resources. It is important to make pupils aware of the social nature of labour.

The practical preparedness is characterized by the level of polytechnical knowledge and practical abilities and skills acquired. The trend towards research into only certain specific aspects of work education seems to be erroneous. The formation of the readiness to work in the developed socialist society pre-determines, in our opinion, the necessity to undertake the complex research, when all aspects are examined in their dialectic unity. If only the intellectual, moral, psychological and practical components of consciousness are integrated, the individual can reach a level of development which permits him to behave and work in accordance with the interests of society.

With regard to the work education of pupils, we start with the assumption that individual, socially significant work is the basic condition and prerequisite necessary to form the readiness to work in the national economy and, at the same time, the beginning and the basis for the training and development of working and professional skills and a way to the comprehensive development of pupils.

This approach is realized in the following ways:

- The content of the working education from the 1st to the 8th form is built on the linear-concentric principle and deals mainly with the technology of processing materials;

- Systematic training to work with metals, wood and electro-assembly work starts in the 3rd year of learning;

- The educational nature of work is strengthened gradually in the content of school programmes, the foundations of the contemporary industrial production and the ways of improving the labour productivity are revealed;

- Modern equipment and technical means are widely used in the process of work education;

- The contents of productive work of pupils (students) is conceived in such a way that it takes into account continuity and their age particularities and also the necessity of fulfilling socially useful tasks and participation of pupils (students) in social production, based on the principles of polytechnic education.

- Productive work by its content permits not only the application of knowledge of general educational disciplines but also serves as a source and stimulator of new knowledge that allows the fullest realization of ideas of linking education with life.

- Work experience of pupils (students) or urban schools is carried out in a school productive work centre (a plant or enterprise); the productive work groups are composed of pupils, foremen responsible for productive education and of highly qualified workers. In rural schools pupils (students) work as members of educative brigades and also together with the teams of workers from state and collective farms;

- Pupils are involved through all means in the educational self-management of productive work;

- In the work centres for pupils (plant, enterprise, centre, educative brigade) productive work is evaluated and paid for by the system of self-management;

- While taking a decision on whether to involve a pupil in a reasonable productive activity, his physical fitness is taken into account;

- Preparation for productive work is divided into successive stages which are characterized as steps leading to pupils' readiness for productive work;

- At the first stage of labour training (grades I-III) the child's activities consist of three components: games, self-help and schooling. At this stage, some features of the following steps in labour training are already

emerging: performance of socially useful types of work, the formation of attitudes and interests and the development of qualities necessary for future professional work;

- At the second stage of labour training (grades IV-V), the participation of pupils in socially useful work is considered necessary, all kinds of activities proper to the first stage being retained with certain modifications: schooling is developing seriously and becoming complicated, activities to help the family, younger brothers and sisters are introduced. At this stage one can distinguish the beginning of the formation of professional interests; conditions for the preparation of a choice of profession are being created.

- At the third stage of labour training (grades VI and VII) immediately preceding the choice of profession, the process of the creation of professional intentions is underway. The participation in socially useful work (second stage) is maintained, as well as the necessity of work for self-help and studies. Games remain in the process of evolution. At the same time, this stage witnesses the foundations of the future choice of profession and forms aptitudes necessary for a given type of activity.

- For the fourth stage (grades VIII-X) of labour training, self-determination and a choice of profession is essential. The contents of earlier stages have been significantly modified: the importance of participation in socially useful work remains, but the links of the learning process with elements of productive work enter into a decisive stage. The fourth stage is therefore considered as transitional from a pre-professional to a professional period of labour training.

Main positions of research and realization of the above-mentioned conception are being based on such fundamental cornerstones of Soviet psychology and pedagogy as:

- close relationship between training, up-bringing, mental and physical development;
- each healthy child's abilities and aptitudes for creativeness;
- possibilities for comprehensive development.

In keeping this continuity between each stage of formation and gradual complication of work, the pupils according to their age and interest are being involved in different kinds of educational, sociable, useful and efficient labour, technical creation, agricultural experimentation etc.

II. PROGRAMMES TO COMBINE EDUCATION AND WORK

Syllabus of Soviet general education schools cover a wide range of science. Moreover our secondary schools create all possibilities for children's training during out-of-school time. Thus in IV-X classes there exist about 70 school programmes, 100 programmes of optimal subjects, 17 programmes of practical lessons. General education schools syllabuses are elaborated with due account to development of scientific and technical revolution which exerts its influence over ways and forms of realization of polytechnical principle and therefore the syllabus takes into account the following particularities of modern production:

1. Machines, apparatus, tools are getting out-dated quicker than before and they are being replaced by others often quite different from the former ones. Due to this a man who works with them should have an ability to adapt himself to a new technology and new means of labour as quickly as possible.

2. Changes in industrial and agricultural technology are getting new and more dynamic. Frequently, changes of fundamental principles used in technology take place alongside with perfection and complication of equipment in keeping to the main principles of its operation.

3. The science itself is turning more and more into direct productive forces: at present there is no law of nature or new discovery which is not applied in production.

4. Many modern machines become very complicated aggregates when very different systems are functioning simultaneously.

Hence, we consider it necessary to indicate some abilities and skills which help to introduce productive labour to pupils. They are the following:

- Knowledge of processes and objects which are being used and of perspectives in main branches of national economy;

- Knowledge of the latest developments in different fields of science which will be applied to industry and agriculture;
- Knowledge of some aspects of production, i.e. planning, understanding of drawings, reading of devices, adjustment of equipment, etc.;
- Ability to use theoretical knowledge in practical activities particularly for improvement of existing techniques and technology;
- Ability to explain some situations in practical work by theoretical aspects of science.

Thus, realization of polytechnical principles in teaching of any school subject supposes the provision of pupils with optimum utilization of knowledge, aptitudes and skills in their studies and practical productive activities. The possibilities and role of particular teaching subjects in providing pupils with polytechnical knowledge are determined on this basis.

Pupils can benefit from many subjects in the curricula which besides theoretical polytechnic knowledge, provide aptitudes and skills permitting them to take part in the productive work.

The course of physics at school helps pupils to acquire deeper knowledge in technology, technical devices, transport, communication and agricultural industry, in technological processes together with industrial engineering.

In school curricula general theoretical laws and understanding of the process of production are so closely connected with other notions that there is a certain difficulty to single them out. The curricula can be adapted to local conditions and possibilities through using different educational and material facilities where it is possible to carry out a significant scope of practical laboratory work. In every grade (from VI to X) where physics is taught, from nine to thirty hours are devoted to laboratory and practical work which makes about 90 hours in total for the whole period of study.

Pupils get acquainted with materials concerning production and technology by means of teacher's explanations of different ways the physical phenomena and laws are applied

in practice, demonstration of visual aids, of working technical models or technical devices themselves and their parts; showing films on physical and technical matters, e.g. 'The Electric Plant', 'The Electric Energy in the Agriculture', 'The Internal Combustion Engine'; also by excursions to enterprises; observations of physical processes by pupils themselves, solving of problems concerning industrial and technical matters; the pupils fulfil laboratory work aimed at the study of physical devices and technical equipment (e.g., air-pumps, water-pumps, hydraulic presses, electromagnetic relay etc.) and properties of materials (resilience, plasticity, electroconductivity etc.); out-of-class reading of literature on science and technology is proposed to the pupils which facilitates the identification of their skills and interests and helps them to choose a profession; the organization of out-of-class work in circles and first of all such circles which deal with the use of devices, technical engineering and develop technical creative abilities; non-obligatory courses and practical training of polytechnical character.

Curricula in the subject of chemistry at school determine the contents of educational material which serves to teach pupils the basis of the chemical industrial processes and the application of chemistry in the national economy; to develop the skill to observe and assess, in the light of the theories which have been studied, those chemical phenomena which take place in nature, laboratory, in industry and everyday life; to develop the skills to handle chemical substances and to carry out chemical operations; to develop love for science, inquisitive mind, the active approach to nature, the ability to acquire by oneself scientific knowledge.

During the study period of four years 112 hours in the curricula on chemistry are devoted to laboratory and practical work.

The school discipline of biology in particular provides pupils with a system of polytechnical knowledge on a scientific basis practically of all branches of modern agriculture and on rational use of natural resources by man (husbandry, cattle-breeding, fur-breeding, fish-breeding, bee-keeping); on the use of micro-organisms in a number of branches of agriculture, on the role of organisms of plants and animals as pathogenic organisms and means to struggle

against them. Studying botany, zoology, general biology school-children both get acquainted with basic biological laws of evolution of nature and learn how they are applied in the national economy, in the life of man. Within the limits of their forces and possibilities they, at the same time acquire a certain scope of skills to apply the knowledge in practice, e.g. in the agricultural production.

Some lessons are given at the places of work, for example in anatomy and physiology - at the cattle-breeding farm, at the local transfusion station, at the veterinary clinic. The teacher or the head of the farm or the livestock specialist, for example, introducing the theme of different types of productivity of animals, remind pupils of the law of correlated variability taking as an example the connection between the development of mammary gland and other organs; they do not only refer to regulating functions of the nervous system and of the glands of internal secretion but explain why the intensive functioning of one organ, of the mammary gland for example, requires the increasing functioning of other organs and the intensified metabolism, and they carry out practical work to determine the productivity of cows, acquaint the pupils with the factors influencing the raising of the productivity. Then the pupils get informed of the specific character of the activity fulfilled by the farm workers.

In the process of studying of all biological subjects, in developing the general understanding of nature in highlighting the questions of application of laws of the organic world in industry, in human practical activity an active work is done to develop in pupils working skills and attitudes. To this end they carry out experimental and research tasks in laboratory and industrial conditions; they fulfil principal works taking care of plants during different periods of phenophases, define the requirements of plants in nutrients according to their outward appearance and with the help of special instruments, make experiments to find the best irrigation regimes, the best time and ways to dress the plants etc.; they fulfil works foreseen by the curriculum in agricultural work, on the school plot (in the fields and at the farms of *kolkhozes* and *sovkhojes*); they work in the circles of young zoo technicians, agricultural technicians, biologists, microbiologists, in the production teams of pupils, in school forestries, in the camps of work and recreation.

Mathematics course provides mathematical knowledge and skill bases acquirement necessary not only for pupils' general development and their practical activity during training but also for the process of productive work (activities in workshops; socially useful labour). Polytechnical education is provided not only with its main content but with a great number of practical character tasks, graphic works, realization of inter-subject relations. It concerns numerous calculations done by pupils in the process of work, for example: definition of circumference and its parts cutting elements, gear ratios, and machine-tool cutting specifications. All that is based on the knowledge and skills acquired by pupils at maths lessons. The fact that pupils use a ruler, compasses, a drawing set square, a protractor, a drawing-board while constructing at maths lessons helps quick mastering of marking methods necessary for practical work in school workshops.

Acquirement of maths course provides great opportunities for fulfilling many other practical tasks like measuring works in the country (angle construction and measuring, segment division in two, gonio-meter survey through turning movement, definition of an inaccessible distance through congruous triangulars, plane-table survey of a lot plan, area measuring with precise evaluation of the results, distance and height definition through the solution of right-angled and oblique-angled triangles); diagram, scheme and concrete quantity dependence graph construction that reflects phenomena known to pupils.

Pupils' knowledge application, for solving various extreme problems under the theme 'Functions' using economics, biology and other fields of science data for calculation also presents some interest.

Teaching and educational work at school and introduction of productive work is realized differentially by age groups: first - third, fourth - eighth and ninth-tenth grades.

Children of first age level are provided with general notion about adults productive work; primary labour skills are formed; teaching and educational work provides for mental, moral, physical and aesthetic development and cultivates diligence in children.

At the second age level in the close links with the study of the foundations of sciences pupils are getting some

notion about modern industry and main fields of production, technical, agricultural, domestic and other types of labour and appropriate knowledge and skill on which bases and participation in socially useful and productive labour. The latter which according to its content requires at this stage preliminary specialized training of pupils is arranged directly at working places.

Natural sciences, technical and managerial principles underlying industry, agriculture, transport and communication are gradually delivered to the pupils of grades IV-VIII. They study mechanical, chemical, biological power and other processes and relevant technology as well as methods of obtaining and treatment of different materials.

At the second stage the vocational training is completed with generalizations applying to the technique, technology, administration and economics of production that are illustrated most of all by the functioning of engineering woodwork, electrotechnical, textile, clothing, agricultural and food enterprises.

At present, two different work-study programmes in 48 grades are being tested.

As the first version, the programme is differentiated for boys and girls. At urban schools girls study service work and boys technical work. At rural schools girls study agricultural and service work and boys agricultural and technical work.

As the second version the programme of vocational training is common for boys and girls. As for grades IV-VI it is the following: pupils begin their engineering studies - 4 hours and get acquainted with certain elements of drawing - 2 hours, wood treatment technology - 14; fabric treatment technology - 18; electrotechnical work - 10 hours, besides that the programme includes introduction and conclusion. Under each subsequent theme, the content is developing and getting complicated. All lessons and pupils' work results are of practical and, as far as possible, of socially useful character. However, differentiation of technical and service work content for boys and girls is partly maintained in that unified programme in grades VII-VIII. It takes into account that the knowledge and skills which are significant for work at other subjects should be given to boys and girls on the same scale. For example at vocational

training lessons all children get acquainted with electrical engineering elements and fulfil electrotechnical works. In the grade VII at physics lessons 'electricity' starts to be studied. It is quite natural that boys and girls should begin such studies having equal level of knowledge and skills.

In grades VII-VIII boys work with metal for 20 hours, wood for 20 hours, get acquainted with engineering studies - 6 hours, electrical engineering - 10 hours, elements of drawing - 2 hours, do complex works - 12 hours. In the same grades, girls work fabric for 40 hours; foodstuffs - 12 hours; do electrotechnical works - 10 hours; get acquainted with engineering studies - 8 hours.

Being the sphere of inter-subject relations and knowledge transfer, inclusion of productive labour elements makes unlimited opportunities for application of comprehensive knowledge on the foundations of sciences, i.e. the same phenomena processes are examined from various points and pupils can realize the unity of the phenomena and processes that they have studying as well as their characteristics and quality diversity.

A certain scope of the types of work as a source of observation and practical information accumulation followed by subsequent theoretical training on the foundations of sciences are provided with the lessons.

Principle of differentiation and profession-oriented training is completely realized at the last stage (grades IX-X) when pupils work in a school productive centre (a training centre, a plant) and in industry and agriculture.

To select objects of work is exceptionally important. In our opinion they should be selected in view of socio-pedagogic, technological and economic requirements among which the main ones are:

1. Social significance of an object of work. A pupil should know what he is doing and for what purpose and how the product of his work will be used.

- Pupils should work to orders of enterprises and institutions. In this case, single and permanent contracts may be concluded;
- Pupils' awareness of social and productive significance of the work being done should be emphasized.

2. In the nomenclature of articles by pupils, psycho-physiological abilities of children at different ages should be taken into account. Technological operations and types of work should not only correspond to a child's psycho-physiological abilities but should further better development of the very organism psycho-physiological functions which forming is of special importance at a definite age. Conditions should be provided for pupils' early participation in productive work. Availability of small articles among objects of work gives an opportunity to teach pupils especially at secondary school how to carry out elementary operations and allows them to participate in public production. Fulfilment of large-scale objects provides pupils with great opportunities as for their acquaintance with different technological processes; relations of production impact on pupils' moral education is strengthening. Manufacturing of an article from beginning to end (naturally with a definite number of components) intensifies the educational impact of work on forming of pupils' personality.

3. The process of labour activity should be properly organized to foster in pupils a love for work and to form initial professional skills.

4. While selecting objects of work the process of work-training should be brought as near to the real industrial conditions as possible.

The content of work in all kinds of labour units is determined by the curricula. The labour activity of pupils at their working places in the plants, fields, farms, workshops, industries of produce processing is carried out in accordance with the productive work plan.

In grades I-III pupils are trained for work in workrooms, in nature-corners and on school experimental sites. In grades IV-VIII pupils acquire the initial knowledge of various kinds of technical, agricultural and service activities. Their work is organized in keeping with the curriculum and school-plans of socially useful and productive work. In grades IX-X pupils are trained for work in school workshops and production units with a view to specializing in one or two trades.

Proceeding from the experience acquired in teaching pupils in rural schools in all areas of the country (tractor and combine-harvesters maintenance, work on mechanized

cattle-breeding farms and complexes) school curricula and syllabuses take into account particular local features and technical progress.

The combination of manual and mechanized labour on school experimental sites (and in the fields) contribute to personal development and progress.

There are various forms of production units to educate for work: school and inter-school workrooms, workshops, inter-school training centres, industrial-training plants, pupils' working brigades, school forestries, labour and rest camps, school teams which group pupils according to their personal interests.

As it may be seen from the experience acquired in rural schools pupils easily get accustomed to accessible for their age agricultural machinery. In grades V-VI they study ploughs, cultivators, seeding-machines; in grades VII-VIII pupils get to know the principles of work and maintenance of small tractors, mechanized ploughing, cultivation, the sowing of industrial and cereal crops. Such practical knowledge of popular agricultural trades, as machine-operator, plant-grower, cattel-breeder, agronomist, allows to solve efficiently the problems of vocational guidance.

According to work-training curricula about 75 per cent of all academic hours are spent on practical production work which is carried out mostly with the application of all necessary machinery. The pupils carry out processes and operations either of industrial or similar character. Thus the organization of practical work aims at the pupils' familiarization with the labour conditions of a wide range of jobs. Moreover, the teachers use methods which help them to draw pupils' attention to the objects and skills of work necessary for the particular industry.

The work training of pupils in senior classes of rural schools is based on the following curricula:

Tractors, agricultural machinery and fundamentals of agrotechnics

Subjects for study	Hours				Total
	Grade IX		Grade X		
	per week	a year	per week	a year	
1. Tractor	2	70	2	70	140
2. Agricultural, machinery and tractor operation technology	1	35	1	35	70
3. Fundamentals of agro-technics of field crops	1	35	1	35	70
4. Practical production work	-	114	-	-	114
Total	4	254	4	140	394

Individual training on operating tractors combine-harvesters (extra-curriculum) lasts two years. In Grade IX - 15 hours, in Grade X - 5 hours

Fundamentals of cattle-breeding and mechanization of cattle-breeding farms

Subjects for study	Hours				Total
	Grade IX		Grade X		
	per week	a year	per week	a year	
1. Fundamentals of cattle-breeding	2	70	1	35	105
2. Mechanization and electrification of cattle-breeding farms	2	70	1	35	105
3. Tractor	-	-	2	70	70
4. Practical production work	-	114	-	-	114
Total	4	254	4	140	394

Individual training on tractor-driving is carried out in Grade X, it lasts 20 hours.

Of some interest is the curricula composed with regard to the optional subjects studied from Grade VIII and sometimes even from Grade VII.

Machine-operators (of general trend)

Subjects for study	Hours for each grade, per week and a year				Total
	VII	VIII	IX	X	
1. Tractor	-	2 (70)	2 (70)	2 (70)	210
2. Agricultural machinery and tractor operating technology	1 (35)	-	2 (70)	1 (35)	140
3. Fundamentals of agrotechnics of field crops	1 (35)	-	1 (35)	2 (70)	140
4. Combine-harvester	-	-	-	1 (35)	35
5. Practical lessons and practice of combine driving	-	10	30	-	-
6. Practical production work	-	72	144	-	-

Lab-assistants - Agrochemists

Subjects for study	Hours for each grade, per week and a year			Total
	VIII	IX	X	
1. Fundamentals of plant-growing	1 (35)	2 (70)	1 (35)	140
2. Agricultural chemistry	1 (35)	2 (70)	2 (70)	175
3. Practical training lessons on curriculum	-	1 (35)	1 (35)	70
4. Practical production work	-	144	-	-

Combining education and work

In the learning process, children are employed as part-time tractor drivers, mowers, hay-stackers, they take part in silo deliveries, harvesting, grain sorting, etc. In the springtime they are engaged in moisture conservation and in the serving of spring wheat, vegetables and melons. The trainees decide themselves the question of job distribution and time-tables. They work on special sites of land attached to their school, in the training team field or in the fields of collective and state farms. An important thing is that every team and every trainee is successively engaged in several types of activity.

The school-children begin to master production skills and techniques and to adopt a creative approach towards their work on their training and experimental land. The work there is organized so as to take into account their future productive activities.

Participation in spring sowing helps the trainees to learn tractor driving, trailer equipment operation, crops agrotechnics; they learn the rules of machine operation and safety engineering. Participation of school-children in hay-mowing entails their learning to drive tractors and to operate trailer equipment. During the harvesting, the pupils learn to operate a combine harvester, study safety arrangements and get to know the organization of harvesting.

Taking part in the preparation of equipment for the field work, the trainees increase their knowledge of the equipment design and maintenance. Those pupils who specialize in livestock breeding and mechanization, are employed as assistant milkmaids. They learn mechanized cow milking, participate in farm equipment maintenance in the autumn and develop their skills in operating various machines in winter.

A network of school societies is purposefully used to raise the level of job training. The members of the young physicists society, for example, get acquainted with the tractor electrical equipment and the young modellers design models of agricultural machines. The grades V-VII pupils study different types of engines in their engineers society. All this enables the children to get to know the technology better and to like it, to acquire technological skills even before they start to study the tractor.

In a number of schools school-girls of grades V-VII are encouraged to help the grown-ups with their work on livestock breeding farms while those of grades VIII and IX raise younger domestic animals and poultry.

In training the school-children for productive work, great significance is attached to the invitation of the most experienced and skilled workers and experts in agricultural production to work as teachers and instructors. The co-operation of school-children with the staff of collective farms (or state farms) is of great importance. The best possibilities for enlisting the school-children's participation in productive work are provided by rural inter-school complexes. This can be illustrated by the example of the Gaivoron inter-school training and production complex of the Rirovograd region. It is the centre of labour training of senior grades school-children of the 13 schools of the region. The course consists of six classes. The pupils of each school attend the complex once a week. The grades IX and X pupils are trained at the complex as professional drivers, tractor drivers of the third class, livestock farm engineers, specialists in agricultural machinery and basic agrotechnics, basic livestock breeding and mechanization of livestock farms, vegetable farm mechanization, as well as vegetable farm engineers, electrical engineers, joiners and machine operators, secretaries and typists, wood-carvers, turners, auto-mechanics, dressmakers, assistant agrochemists, cooks and builders (specialized plasterers and bricklayers).

The types of training are determined by the regional workforce requirements. The problem of future trade selection and mastering by school-children is solved much more successfully at the complex than at school. This can be explained by a wide variety of trades to master as well as by a large network of different technological and natural scientific societies where every pupil is provided the possibility to increase his knowledge and to acquire new skills and abilities. Young mechanics and naturalists stations comprising more than 30 various societies are organized directly at the complex.

The complex has five school and production buildings which house three workshops: metalworks, woodworks and dressmaking as well as several classrooms, those of service facilities, construction, primary school technological

activities, professional orientation and agrochemistry. There are 17 laboratories at the complex which help study automobiles, tractors, agricultural machinery, livestock farm equipment and electrical and radio equipment.

The workshops, laboratories and classrooms are equipped with teaching aids which meet the production ethics and safety requirements.

For the purpose of practical studies and educational and production practice the complex has a sufficient number of automobiles, tractors, agricultural machines. The teaching and practice facilities of the complex are constantly developed and increased. The classroom and laboratory equipment and visual aids are made by the pupils themselves during their creative activities in societies as well as by their teachers and vocational training instructors.

The concentration of budgetting as well as funds raised from the sales of goods produced at the complex make it possible to spend considerable sums on the expansion and maintenance of teaching and production facilities, acquisition of equipment and provision of three free meals a day for the pupils.

The 'Sputnik' experimental and training farm organized at the complex covers an area of 88 hectares. A pond and several small livestock farms are built on an area of 10 hectares which is not suited for crop rotation. During the summer vacation it is the site of a labour and recreation camp.

The aim of the planning and organization of studies at the complex is to provide the pupils with a system of knowledge, practical skills and habits necessary for a modern production worker.

The maintenance of education at the complex include lessons, laboratory, practical and individual classes, as well as production practice. The teachers largely employ the elements of a system combining lectures with practice, seminar classes and credit examinations.

Great attention is paid at the complex to the use of technical means of education, various visual aids showing the cross-section of units and mechanisms, natural samples, operating models, mechanized stands, etc.

Based on the careful examination of the pupils' individual inclinations purposeful work is done in the field of the professional orientation of the pupils. For this purpose a club of professional orientation was established at the complex, where the pupils get to know the peculiarities of various jobs, the requirements that those who work in those fields have to meet, receive exhaustive explanations as to the peculiarities of these jobs, its conditions and remuneration.

To train school-children for socially useful and productive work means to lay the foundation of moral health and harmonic development of man. This is a problem of great social importance.

Our socialist society not only entitles school graduates to a choice of profession according to their inclinations, skills and abilities but also creates the necessary conditions for their successful labour education; it does everything possible to make their start in grown-up life confident and purposeful.

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